

REMARKS

Claims 29, 30, 34-40 and 74-84 are pending in this application. Claims 31-33, 41-43 and 56-58 have been withdrawn from consideration. By this amendment, claims 40, 54, 55 and 59-73 are canceled, claims 74-84 are added and claims 29, 30, 34, 35, 38 and 39 have been amended. Reconsideration and allowance based on the above amendments and following remarks are respectfully requested.

Applicant gratefully appreciates the courtesies extended to Applicant's representative during the personal interview conducted on May 7, 2002.

The Examiner indicates that Figs. 1-6 should be labeled as "prior art". Pursuant to the attached Request for Drawing Changes, Figs. 1-6 have been labeled as "prior art". Accordingly, withdrawal of the rejection is respectfully requested.

In response to the Examiner's rejection of the claims as being unduly multiplied, the claims have been amended which limits the number of independent claims and provides some features of the present invention in dependent format. Accordingly, Applicant respectfully submits that the claims are no longer unduly multiplied and requests withdrawal of the rejection.

The Examiner has rejected claims 29, 30, 34-40, 54, 55 and 59-73 under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed.

The Examiner has indicated that the recitation of "valve body posts" and "valve spool posts" are not supported in the specification. In response, the claims have been amended to now recite "valve body lands" and "valve spool

lands". Support for this amendment can be found at least on page 27, lines 20-25. Accordingly, applicant respectfully requests withdrawal of the rejection.

The Examiner has rejected claims 29, 30, 34-40, 54-55 and 59-73 under 35 U.S.C. §112, second paragraph as being indefinite. Specifically, the Examiner provides several instances where the claims are indefinite and vague. In response, amendments to the claims have been made which correct for these instances of indefiniteness and vagueness. Accordingly, applicant respectfully requests withdrawal of the rejection.

The Examiner rejects claims 29, 34-39 and 54 under 35 U.S.C. § 102(b) as being anticipated by Kobayashi et al. (U.S. Pat. No. 5,645,107); claims 59-73 under 35 U.S.C. § 103(a) as being unpatentable over Kobayashi in view of applicant's admitted prior art Fig. 4 and claims 30, 40 and 55 under 35 U.S.C. § 103(a) as being unpatentable over Yuuichi (JP 08104246) in view of Kobayashi. These rejections are respectfully traversed.

Claims 40, 54, 55 and 59-73 have been cancelled. Thus, the rejections in regard to these claims are now moot.

Embodiments of the present invention provide a hydraulic control valve in which only the lands of the first and second oil grooves facing the throttle portions between the oil supply chambers and the oil feed chambers or facing the throttle portions between the oil discharge chamber and the oil feed chambers are provided with chamfer portions. These chamfer portions are formed on the corners of the lands. The valve body lands and valve body spool are provided in pairs and only one of the valve body land or valve spool land in

the pair has a chamfered corner. This reduces the number of portions where the flow rate is to be controlled. Further, providing the unique arrangement of the present invention allows the flow rate which is to be distributed to each of the portions where the flow rate is to be controlled, to be doubled (as compared with Kobayashi). This creates a stabilization of the hydraulic characteristics in a region where the flow rate to be controlled is minimum and eliminates discontinuity in the hydraulic characteristics. Thus, the flow rate of the hydraulic pump can be increased on the basis of a steering angular velocity of the steering wheel (when a steering operation is carried out), and the controlled flow rate of the hydraulic control valve can be abruptly increased from a very small flow rate to a high flow rate efficiently while also eliminating the discontinuity in the hydraulic characteristics.

In contrast, Kobayashi discloses a hydraulic pressure control valve in which the valve spool contains valve spool lands in which each of the lands has both corners chamfered. Kobayashi further fails to disclose the use of a pair of lands in which only one of the lands within the pair has chamfered corner. Therefore, the advantages of the present invention cannot be utilized by the configuration of Kobayashi. Thus, Kobayashi fails to disclose or suggest, *inter alia*, a valve body, including a plurality of valve body lands; and a valve spool, fitted into said valve body so as to be changeable in relative angle, said valve spool including a plurality of valve spool lands; wherein only one of said valve body and said valve spool includes pairs of chamfers which are so formed that

each of ones of the valve body lands and the valve spool lands has only one chamfer, as recited in claim 29 and similarly recited in claim 39.

Further, Yuuichi does not make up for the deficiencies of Kobayashi. Yuuichi discloses hydraulic control valves in various configurations. These configurations, however, do not disclose or suggest the configurations of the present invention in which one of a pair of lands has only one chamfer. Accordingly, Yuuichi cannot provide the advantageous of applicant's invention.

In view of the above, applicants respectfully submit that Kobayashi and Yuucihi in combination or alone fail to provide applicant's claimed invention. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

CONCLUSION

For at least these reasons, it is respectfully submitted that claims 29, 30, 34-40 and 74-84 are distinguished from the prior art. Favorable consideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further is necessary in order to place this application in condition for allowance, the Examiner is invited to contact Chad Billings (Pat. Reg. No. 48,917) at 1-703-205-8001.

If necessary, the Commissioner of hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Claim 29. A hydraulic control valve comprising:

a valve body, including a plurality of valve body [posts] lands; and

a valve spool, fitted into said valve body so as to be changeable in relative angle, said valve spool including a plurality of valve spool [posts] lands;

wherein only one of said valve body and said valve spool includes [alternate] pairs of chamfers which are so formed that each of ones of the valve body lands and the valve spool lands has only one chamfer.

Claim 30. The hydraulic control valve according to claim 29, wherein [alternating] the pairs of chamfers are on [consecutive] all of the valve spool [posts] lands.

Claim 34. The hydraulic control valve according to claim 29, wherein said valve body includes a plurality of first oil grooves formed between said valve body [posts] lands.

Claim 35. The hydraulic control valve according to claim 34, wherein said valve spool includes a plurality of second oil grooves formed between said valve spool [posts] lands.

Claim 38. The hydraulic control valve according to claim 29, wherein chamfers adjust a throttle area.

Claim 39. A power steering apparatus, comprising:

a hydraulic pump, being driven by an electric motor for supplying oil pressure to a hydraulic cylinder for steering assistance; and

a hydraulic control valve; interposed in a hydraulic pressure path between said hydraulic pump and hydraulic cylinder, for controlling oil pressure from said hydraulic pump to two cylinder chambers included in said hydraulic cylinder, [wherein said hydraulic control valve is the hydraulic control valve described in claim 29] said hydraulic control valve comprising:

a valve body, including a plurality of valve body lands; and a valve spool, fitted into said valve body so as to be changeable in relative angle, said valve spool including a plurality of valve spool lands;

wherein only one of said valve body and said valve spool includes pairs of chamfers which are so formed that each of ones of the valve body lands and the valve spool lands has only one chamfer.